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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/720,972	11/24/2003	David R. Gabe	50798-2 DIV	5213

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John J. Piskorski
c/o EDWARDS & ANGELL, LLP
P.O. Box 9169
Boston, MA 02209

EXAMINER

ZHENG, LOIS L

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 11/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/720,972

Applicant(s)

GABE ET AL.

Examiner

Lois Zheng

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 September 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 61, 62 and 64-73 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 61-62 and 64-73 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of Claims

1. Claims 61-62, 64-68, 71-73 are amended in view of the amendment filed 8 September 2006. Claims 60 and 63 are canceled in view of the amendment. Therefore, claims 61-62 and 64-73 are currently under examination.

Terminal Disclaimer

2. The terminal disclaimer filed on 8 September 2006 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent Application No. 10/720,647 has been reviewed and is accepted. The terminal disclaimer has been recorded.

Status of Previous Rejections

3. The rejection of claims 61, 63-64 and 72 under 35 U.S.C. 112, second paragraph, are withdrawn in view of the claim amendments filed 8 September 2006.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 61-62, 64, 66-67 and 72-73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holtzman et al. US 4,891,069(Holtzman) in view of Foster US 6,221,231 B1(Foster).

Holtzman teaches copper electroplating of circuit boards(abstract). The electroplating apparatus of Holtzman includes an anode, a cathode and power source for providing current between the anode and the cathode(col. 29, lines 12-17). Holtzman further teaches an electroplating bath comprising an adjuvant (promoter), wherein the adjuvant (promoter) may be a heterocyclic compound containing R groups, when taken with the heterocyclic ring, forming naphthalene, quinoline, etc. (col. 24 line 31 – col. 25 line 10). Holtzman further teaches that the copper electroplating bath comprises copper sulfate(col. 23 line 46 col. 24 line 8).

However, Holtzman does not teach the plating solution comprising an additive consumption inhibiting alcohol having the claimed formula as recited in claims 61-62.

Foster teaches an electroplating bath for copper, nickel or chromium plating, wherein the electroplating bath comprises a combination of Class I brighteners such as such as naphthalene and Class II brighteners such as ethylenic alcohols to produce a spectacularly bright coating finish(col. 4 lines 16-33).

Regarding claims 61-62, it would have been obvious to one of ordinary skill in the art to have incorporated the ethylenic alcohols as taught by Foster into the naphthene containing plating bath of Holtzman in order to achieve a spectacularly bright finish as taught by Foster(col. 4 lines 19-21). Therefore, the ethylenic alcohol as taught by Holtzman in view of Foster read on the claimed additive consumption inhibiting alcohol having the claimed chemical structure. In addition, since the source of copper to be plated in the apparatus of Holtzman is from the copper electroplating bath, the examiner

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concludes that the anode used in the apparatus of Holtzman is inherently an insoluble anode.

Regarding claim 64, Holtzman further teaches that the electroplating bath comprises about 0.4 to about 8 parts of an adjuvant (promoter)(col. 23 lines 50-55). Therefore, when naphthalene compounds are used as the adjuvant(promoter), they would be in the amount of about 0.4 to about 8 parts. Since Holtzman in view of Foster teach using naphthalene in combination with ethylenic alcohol, one of ordinary skill in the art would have found it obvious that the ethylenic alcohol would have been present in a comparable amount to naphthalene, such as about 0.4 to about 8 parts, in order to realize the spectacularly bright effect. Therefore, the implicitly taught ethylenic alcohol concentration by Holtzman in view Foster overlaps the claimed additive consumption inhibiting alcohol concentration of about 0.001g/ to about 100 g/l. Therefore, a prima facie case of obviousness exists. See MPEP 2144.05. The selection of claimed additive consumption inhibiting alcohol amount range from the implicitly disclosed ethylenic alcohol range of Holtzman in view of Foster would have been obvious to one skilled in the art since Holtzman in view of Foster teach the same utilities in their implicitly disclosed ethylenic alcohol concentration range.

Regarding claim 66, Holtzman teaches that the sulfuric acid is present in the electroplating bath in the amount of 10-200 ml/l(col. 23 lines 62-66). Holtzman further implies that the electroplating bath is acidic(col. 25 lines 39-46). Therefore, the examiner concludes that the acidic electroplating bath of Holtzman in view of Foster meets the limitation of the claimed pH range of from 0 to about 8.0.

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Regarding claim 67, Holtzman teaches the presence of copper sulfate in the electroplating bath as claimed.

Regarding claim 72, the circuit board as taught by Holtzman in view of Foster meets the limitation of the instantly claimed cathode.

Regarding claim 73, the claim limitation with respect to current density is directed to how the claimed apparatus can be operated(i.e. process limitation), therefore, does not lend patentability to the instant apparatus claim. As stated in MPEP 2114 [R-1], it is well settled that the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus as long as the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987). Even if the claimed current density of about 1 to about 1000 amps/square feet(i.e. about 0.1076 –107.6 amps/square decimeter) were to be given patentable weight, the claimed current density is still does not distinguish from Holtzman in view of Foster since Holtzman teaches an electroplating current density of about 1 to about 10 amps/square decimeter(col. 27 lines 7-13).

6. Claims 65 and 68-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Holtzman in view of Foster, and further in view of Okinaka et al. US 4,469,564 (Okinaka).

The teachings of Holtzman in view of Foster are discussed in paragraph 5 above. However, Holtzman in view of Foster do not explicitly teach that the plating solution

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further comprises the claimed additives as recited in claim 65. Holtzman in view of Foster also does not teach the claimed insoluble anode materials.

Okinaka teaches and electroplating apparatus comprising a non-consumable anode made of materials such as platinum, platinized titanium. Okinaka also teaches that non-consumable anodes such as iridium and/or tantalum oxide covered titanium electrodes are particularly useful. Okinaka further teaches that the anodes comprise binder metals such as beryllium, strontium, etc. Okinaka further teaches adding ductility modifier to the electroplating bath to improve the ductility of the plated metal layer(col. 1 lines 50-56, col. 4 lines 24-33).

Regarding claim 65, it would have been obvious to one of ordinary skill in the art to have incorporated the additives such as the ductility modifier as taught by Okinaka into the electroplating coating bath of Holtzman in view of Foster in order to improve ductility of the plated metal layer as taught by Okinaka.

Regarding claims 68-71, it would have been obvious to one of ordinary skill in the art to have incorporated the non-consumable anode of Okinaka into the electroplating apparatus of Holtzman in view of Foster in order to the achieve long lifetimes and stability as taught by Okinaka (col. 2 lines 51-55).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Lois Zheng whose telephone number is (571) 272-1248. The examiner can normally be reached on 8:30am - 5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

LLZ


ROY KING
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 1700